

ROCKET FLIGHT TO THE MOON -- FROM IDEA TO REALITY

Rudolf Nebel

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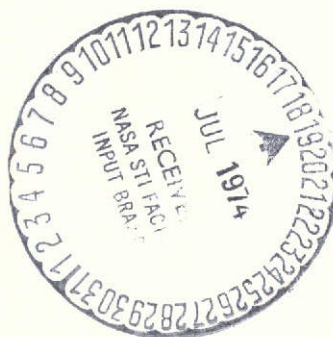
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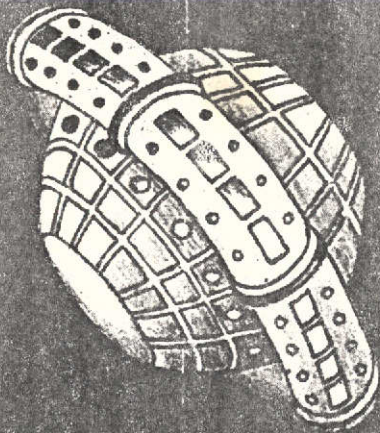
There is no stronger force in nature than an idea whose time has come. About the turn of the century, it was the idea of flying. Thus, the "journey to the Moon" already began in 1908, when I bought for 25 Pfennig in Nürnberg Jules Verne's book The Journey to the Moon, which described how three men were to be shot to the Moon in a giant projectile from a cannon near Cape Kennedy. However, I figured out that this was not possible, since all three men would have been immediately killed when the projectile was fired. /*

I then went with this book to my physics professor, Dr. Hess, at the high school in Nürnberg and asked him how and whether a person could actually get to the Moon. He too read through this book and then said that he did not know either, but this book gave a figure of 11.181 m/sec as the velocity that a body must have in order to leave the gravitational attraction of the Earth, and this pointed to rockets! But what was known at that time about rockets? We then found out that the Chinese had already invented rockets in 800 as incendiary arrows, and that German rocket corps had played a role in the War of Liberation [1813-1815].

When rifled guns came on the scene, these military rockets disappeared, and rockets were restricted to fireworks and signal rockets. Professor Hess then advised me to get involved with flying so that I could get an idea for myself of how and whether we could actually get to the Moon. But what did we know about flying at that time? I found out that Otto Lilienthal had already made more than 2500 flights in the years 1890-1896 in a

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Foto Nebel 1932





Rudolf Nebel

glider he had put together himself, thus laying the foundations for present-day powerless and powered flight. Thus, at the start of the century, powered flight began in Berlin-Johannisthal. I wanted to see this powered flying for myself, close up. Now I did not just go out and buy myself a train ticket, although a fourth-class ticket from Nürnberg to



Fig. 2. Home-made bicycle.
No. 18351.

Berlin and back would have only cost 5 Marks, but instead built myself a bicycle for these 5 Marks (Fig. 2). In order to be able to ride it, I had to pass a bicycle test in front of the 16 aldermen of Nürnberg, whereupon my bicycle acquired the number 18351, and now I could ride it to Berlin. Five hundred kilometers going, five hundred kilometers back on streets which were hardly dust-free, which were full of horseshoe-

nails, and plagued by dogs which chased after me -- what an adventure! In Johannisthal I then saw the first airplane, which flew around at housetop height when there was no wind at all, and this made me so enthusiastic that I immediately resolved to take part in this flying. Naturally, I needed something which would require only a minimum of expense, and so I decided to build a large kite which would carry me aloft and then glide

back to the ground. However, once I had built the kite, I was forced to admit that it was not at all capable of lifting me off the ground. Instead, I found out that I would have needed eight such kites. However I did not have the money. But now I got the money in an original manner! I built myself a cardboard camera, installed it in this kite, tripped the shutter with a string, an elastic cord, and a cigarette 1000 m above /
Nürnberg, and obtained the first aerial photographs of Nürnberg from the kite. At that time, I took more than 200 such aerial photographs. They sold like hotcakes, so I no longer had to

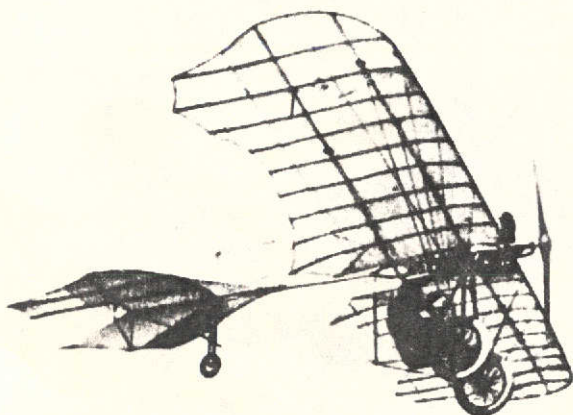


Fig. 3. Home-made airplane.
Pilot license No. 178.

build large kites, but instead had the money to build a genuine monoplane (Fig. 3), such as I had seen in Johannisthal. With it, I rolled around the training ground in Nürnberg in 1911. Now this method of procuring money was naturally very arduous, so I wrote at that time to the War Ministry, stating that it would someday be possible to utilize such aircraft

for military objectives, and requested financial assistance in my work. The reply was a disappointment. They wrote back that aircraft could never gain military significance, because piloting an airplane required acrobatic agility. On August 15, 1912, I won my Bavarian pilot's license No. 178 with a flight from Nürnberg to Frankfurt and back. Within 2 years, the War Ministry had to admit that war could not be conducted at all without aircraft. Because of this short-sightedness, we arrived at the front with 750 old Taubes, while the French had already



Fig. 4. Rudolf Nebel in a Taube, 1914.



Fig. 5. Emergency landing in an LVG biplane.

turned up with 3000 new airplanes, securing air superiority for the enemy from the outset. However, the War Ministry was yet to receive an even more drastic proof of the necessity of airplanes. At the beginning of September 1914 (Fig. 4), the flyers returned with the information that the French were retreating in flight toward Paris, but / they were ridiculed, because the cavalry had reported that the French were advancing in full strength toward the Marne.

A General Staff Officer was summoned from the Central Headquarters in Spa to make a decision. He decided for the report of the cavalry and used his authority to order a retreat to the Marne.

But what would have happened if we had conquered Paris at the beginning of September in 1914? In hindsight, we can only say that the entire First World War would have gone differently. Only now did the War Ministry recognize that airplanes (Fig. 5) had to be built in

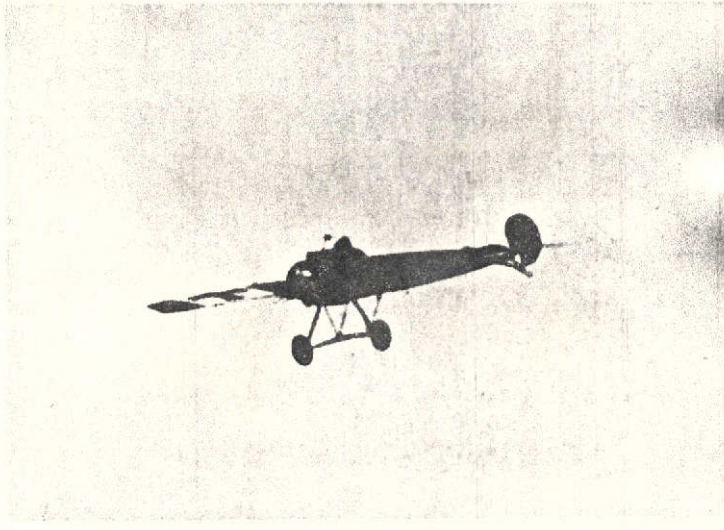


Fig. 6. As fighter in Fokker monoplane.

great haste and that we had to fly them!

In 1916, I then sat in the cockpit of a Fokker monoplane (Fig. 6) with two machine guns, which fired through the propeller and were supposed to shoot down enemy airplanes. I soon found out that things were not this simple.

With these primitive machines, one had to fly within 20 m of the enemy aircraft in order to hit it at all. However, the air superiority of the enemy was about 10:1. Before I could get within the 20 m, my own craft had long since been hit. Shards flew; the machine went out of control and into a steep dive. Then there was another fearful crash. When I woke up, I was in a field hospital covered with bandages. I now had time to consider whether it would not be better to shoot down enemy airplanes with rockets from a distance of 200 m, instead of with machine guns from a distance of 20 m.

When I was released from the hospital, I went to the nearest engineering-supply depot, drew out the largest signal rockets, and somehow attached warheads to them, so that everyone was tensely waiting to see what would happen when one day, 4000 m / up, we encountered an enemy squadron with 25 planes. I pressed the button; an immense trail of powder passed through the center of the enemy squadron. One immediately dropped the nose of his plane, and went into a dive, landing on the nearest meadow, with me behind him. Trembling with fear, he explained to me that he had taken fright and landed his plane as quickly as

possible before the second shot. With the second shot, I succeeded in shooting away an enemy propeller. Only with the third shot did I get into trouble; I shot myself down. When I pressed on the buttons, these primitive, literally hand-made rockets exploded before they had left my airplane. The aircraft caught fire -- and there weren't any parachutes at that time.

I plummeted toward the earth in my burning machine. But then I had an improbable stroke of luck. Right next to where the burning aircraft struck the ground, there were two privates working on line construction and they got me out of the burning aircraft in time. I certainly would not have escaped by myself. They delivered me, somewhat burned, to the hospital. I was immediately commanded to cease using these new weapons. However, we had to have a new name for this weapon. We baptized them "Nebelwerfer" [translator's note: pun on author's name; literally, "smoke thrower"], and still tried to get these Nebelwerfer used in the First World War. However we did not succeed. We had to continue fighting with machine guns, and in 1918 I acquired the best fighter plane of the First World War, a Pfalz D 8 (Fig. 7)



Fig. 7. As fighter in Pfalz D 8 with 300-hp rotary engine.

with a 300-hp rotary engine, with which I could climb to 8000 m in 30 minutes. The air battles at elevations of 8000 m taught me that I could take these aircraft up only as far as there was still air. If one wished to fly higher into airless space, one would require an entirely different type of drive, namely

that jet or rocket drive which I later patented as the jet engine for liquid fuels under the number DRP 633,667.

After the War, I initially had other worries. I got my degree at the University of Munich in 1919. In order to finance further rocket research, I founded a fireworks factory at Pulsnitz in Saxony. I sold fireworks to rifle clubs, and as a sideline, continued my research on rockets. I and some comrades who had survived World War I with me believed that we had to do something to prevent a second World War, and one contribution could be a rocket which would fly at least 1000 km and which would later be equipped with an atomic bomb. We chose the slogan "no more war" and founded an International Research Society, which later received the name "PANTERRA" with the objective of stimulating the interest of the peoples of the Earth in the major problems of science and technology, and thus to divert unnecessary funds for armaments to peaceful and productive work. This world peace program of PANTERRA was organized as follows:

1. Rocket flights for the purpose of space travel,
2. Atomic energy for peaceful purposes,
3. Robots to relieve mankind of manual labor,
4. Geothermal power plants for exploiting the heat of the Earth,
5. World power plant Gibraltar -- lowering the Mediterranean Sea,
6. Making fertile the Sahara Desert,
7. Large-scale wind power plants,
8. Tidal power plants,
9. Solar mirrors to influence weather,
10. Inventor central, inventor bank, and utilization agency.

In 1927, the Society for Space Flight was founded. In 1928, the first rocket cars were driven on the Avus test road. In

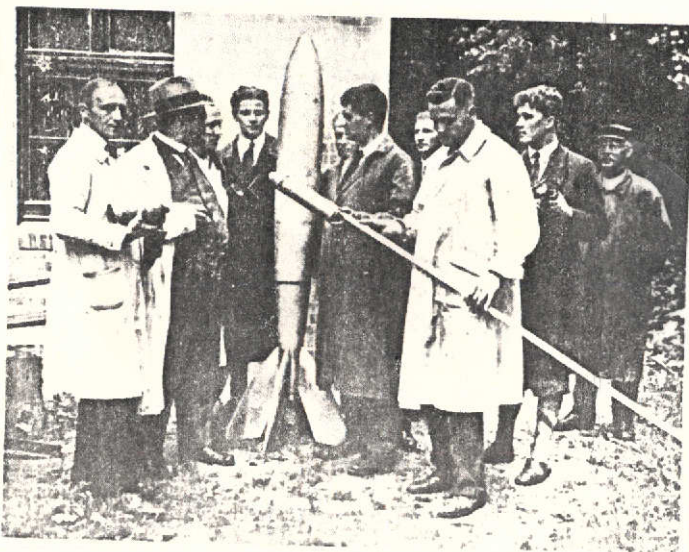


Fig. 8. Zero hour for space flight. Experts from Chemisch-Technische Reichsanstalt [Reich Chemical Engineering Laboratory] with Nebel, Oberth, von Braun, and Dr. Ritter.

1929, UFA filmed a movie "Woman on the Moon" that employed as scientific advisor Hermann Oberth, who / had already published the book Rockets to the Planets in 1923.

On the UFA lot, I met Hermann Oberth, and this meeting turned rocket flight into reality. UFA provided the first

35,000 marks for the first liquid-fuel rockets, which were built at IG Farben in Bitterfeld, brought about the first combustion tests with liquid oxygen and gasoline, resulting in a consultation (Fig. 8) on July 23, 1930, with the Reich Chemical-Engineering Laboratory at Berlin, which Prof. Einstein then supported with the remark that the liquid-fuel rocket was the "ideal long-range weapon" and the foundation of space flight."

Thus, on September 27, 1930, I established the first launch site in the world in Berlin-Reinickendorf. Starting with minimum rockets with 1 liter liquid fuel, abbreviated MIRAK 1, and through 4 liter, 50 liter, and 500 liter rockets, the theoretical foundations of the V 2 rocket (Fig. 9) were worked out, resulting in the patent DRP 633,667, jet engine for liquid fuels, and DRP liquid fuel rocket as a secret patent with the number N 32827 I 46g. The first liquid-fuel rockets, driven with liquid oxygen and gasoline, were launched from an island in the Tegeler See. A first manned rocket, the "Magdeburg piloted rocket" was built, the financing of which was assumed by the later mayor of Berlin,

Prof. Reuther. It did not get beyond a test launch in Magdeburg, because on Jan. 30, 1933, Adolf Hitler came to power, the rocket became a "secret command matter," and the tests were transferred to the authority of the Army Weapons Office.

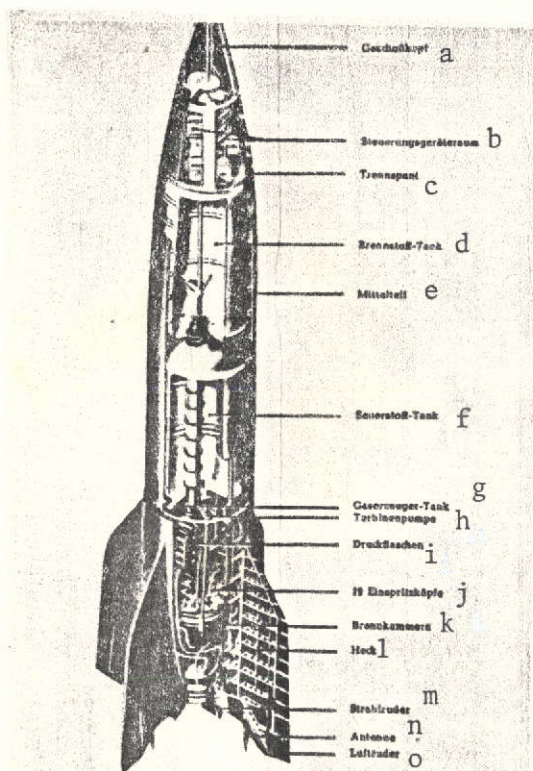


Fig. 9. Cross section of a V 2.

Key: a. Warhead
 b. Guidance chamber
 c. Dividing wall
 d. Fuel tank
 e. Center section
 f. Oxygen tank
 g. Gas-generator tank
 h. Turbine pump
 i. Pressure cylinders
 j. 19 injection heads
 k. Combustion chambers
 l. Tail
 m. Jet vane
 n. Antenna
 o. External control vane

The Reich Central Security Office (RSHA) in Berlin took over supervision of the restricted rocket launch site in Berlin. I succeeded in convincing them that it was important to put together a documentary film to record the experiments for posterity. This was possible because the Siemens Company had brought out the first narrow-film device in 1930, and I got the idea of filming the experiment from the beginning. The documentary film "Rocket Flight 1944" was produced, but confiscated by the English on May 2, 1945. Through my personal visits to London, I succeeded in obtaining the release of this documentary film and having it deposited in the Federal Film Archives in Koblenz. On May 2, 1945, the Americans arrived at the V-weapons plant

Nieder-Sachswerfene in Harz, took possession of the last 18 V 2s, and 25 Vals, and all the German Patents, took 200 German rocket researchers, led by von Braun to the USA, and there developed their liquid-fuel rockets, including 15 Saturn V rockets, the seventh of which had already landed on the Moon by July 20, 1969.